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A New Species of *Rabdotus* (Gastropoda: Pulmonata: Bulimulidae) from Arizona

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Abstract.—A new species of *Rabdotus* (Gastropoda: Pulmonata: Bulimulidae) from Arizona by Walter B. Miller and Richard L. Reeder. *Bull. Southern California Acad. Sci.,* 83(2):106–109, 1984. A new species of the land snail family Bulimulidae, *Rabdotus christenseni* Miller & Reeder, is described from the Santa Rita Mountains of Arizona.

The genus *Rabdotus* Albers, 1850, in the family Bulimulidae, barely makes its appearance in southernmost Arizona, where *R. nigromontanus* (Dall, 1897) can be found in Peña Blanca Canyon of the Pajaritos Mountains.

During the course of an environmental impact study of the northern end of the Santa Rita Mountains, conducted by the University of Arizona in 1981, the senior author was surprised to find an isolated population of what appeared to be *R. nigromontanus,* in the immediate vicinity of Sycamore Spring, about 2½ mi NE of Helvetia. A second collection, on 25 July 1981, by the authors and two graduate students, Shelley Maxfield and Robert Carey, yielded several live adults which were found crawling, after a rain, along with many *Sonorella magdalenensis* (Stearns, 1890), in a large rockslide about 100 meters up canyon from Sycamore Spring. The lot was catalogued as *R. nigromontanus,* with the note that this isolated population represented a northern extension of the range of the species by some 70 kilometers.

Subsequently, in the course of a visit to the University of Arizona, Carl C. Christensen, who has done extensive work on the genus (Christensen 1978), examined the specimens and called to our attention that the shells differed substantially from those of *R. nigromontanus.* Critical examination of whole mounts of the reproductive anatomies also revealed significant differences, and it was determined that this population represented a new species, described below.

Family Bulimulidae
Rabdotus christenseni new species
Figs. 1 & 2

Description of shell of holotype.—Shell small, umbilicate, slender, the diameter about one-half of the height; rather thin, rib-striate, the striae mostly white to tan, on a tawny or white mottled ground, slightly glossy. Embryonic whorls 2 in number, rounded with strong, closely-spaced, axial riblets; faint traces of closely set, fine, spiral threads visible in the interstices of the axial riblets of the first whorl but absent on the second whorl. Post-embryonic whorls bearing irregularly-spaced growth ribs, with occasional minute pits and traces of scattered, fine, spiral striae. Peristome slightly reflexed, the ends joined by a thin parietal callus. Maximum height 17.7 mm, diameter 8.4 mm; 6 whorls.

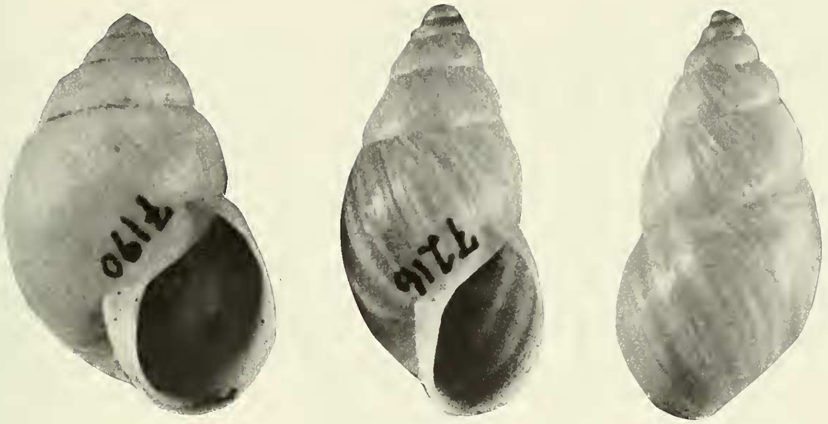

Fig. 1. Left specimen: *Rabdotus nigromontanus* (Dall, 1897), WMB 7190. Middle and right specimens: Holotype of *Rabdotus christenseni,* new species, CAS 037525, apertural and dorsal views. All figures ×3.1.

Reproductive anatomy of holotype.—Diagnostic characters are in the penial complex. Penis 7.5 mm in length, entirely contained within a thick penial sheath; epiphallus 7.0 mm, the lumen of the apical 3.0 mm lined by shallow longitudinal folds, then distally, for about 2.0 mm, the folds assume a spiral arrangement; remaining distal 2.0 mm contain highly convoluted, glandular diverticula. Junction of epiphallus and penis marked by a distinct constriction of the lumen. Epiphallic caecum 5.0 mm; penial retractor muscle very short, 0.8 mm long, attached to apex of epiphallic caecum. Vas deferens runs free from its origin at base of prostate gland, along free oviduct and vagina, and enters penial sheath at about 2.0 mm from genital orifice; it continues apically within the penial sheath, but free of the penis, and resurfaces at the apical end of the sheath, after which it runs alongside the epiphallus until its insertion at junction of epiphallus and epiphallic caecum.

Variations in paratypes.—A total of 4 adult, entire shells and 6 immature or damaged shells were collected in two separate visits. The largest adult paratype measures 17.3 mm in height and 8.4 mm in diameter, and the smallest measures 16.8 mm and 8.4 mm respectively. All specimens, adult and immature, show the characteristic sculpture and slenderness of the species.

Disposition of types.—Holotype: CAS 037525. Paratypes: WBM 7216, personal collection of W. B. Miller, and RLR 543, personal collection of R. L. Reeder.

Type locality.—Pima Co., Arizona; north end of the Santa Rita Mountains, in large rockslide on left bank of south fork of Sycamore Creek, ca. 100 meters upstream from Sycamore Spring; Lat. 31°52.9′N, Long. 110°45.7′W; elevation ca. 1300 meters (4250 ft).

Remarks.—*Rabdotus christenseni* is most closely related to *R. nigromontanus* and probably evolved, over a long period of geographical isolation, from a common ancestral population. It differs from *R. nigromontanus* in being more slender, with a height/diameter ratio of about 2.1 whereas *R. nigromontanus* has a typical

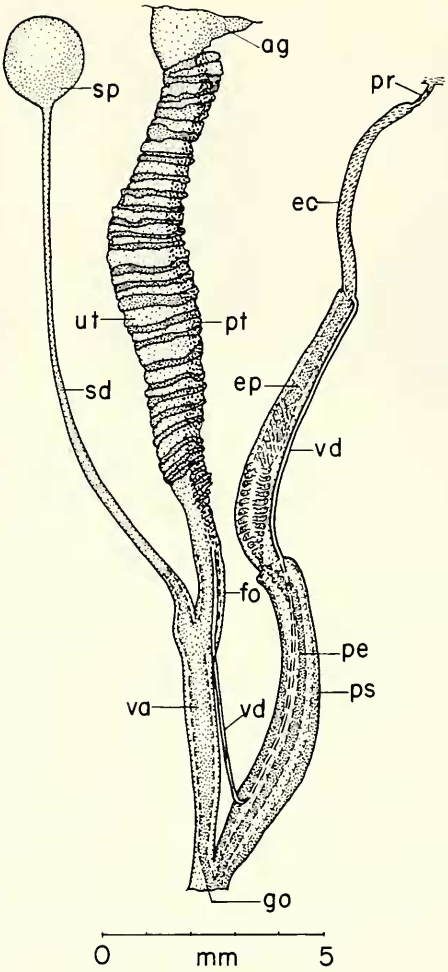

Fig. 2. Lower genitalia of *Rabdotus christenseni*, new species; ag, albumen gland; ec, epiphallic caecum; ep, epiphallus; fo, free oviduct; go, genital orifice; pe, penis; pr, penial retractor muscle; ps, penial sheath; pt, prostate; sd, spermathecal duct; sp, spermatheca; ut, uterus; va, vagina; vd, vas deferens.

ratio of 1.6, as determined from 28 specimens in 8 lots collected in the Pajaritos Mountains and in northern Sonora. Moreover, *R. nigromontanus* does not have the prominent rib-striae sculpture of *R. christenseni*. In its reproductive anatomy, *R. christenseni* is distinguished by its long, thick penial sheath which encloses the entire length of the penis, whereas in *R. nigromontanus*, it encloses only the lower half of the penis.

Superficially, *R. christenseni* has the same general shape as *R. pasonis* (Pilsbry, 1902), found in Texas and New Mexico, with the nearest population about 300 miles to the east of the Santa Rita Mountains. *R. pasonis*, however, has a smaller and more slender shell, lacks the prominent rib striae of *R. christenseni*, and has a relatively smaller aperture.

Van Mol (1971), in his anatomical comparison of many species and genera of Bulimulidae, describes the histology of the various regions of the penial complexes; he considers the convoluted, glandular diverticula, the "*diverticules pêniens,*" to be a subdivision of the penis. Pilsbry (1946, p. 4) refers to these glandular structures, in *Rabdotus,* as numerous ducts in the lower end of the epiphallus. Christensen (1978), in his definitive, extensive treatment of *Rabdotus* in Baja California, considers them to be a part of the penis, as indeed they appear to be in the dissections of Baja California species available to us. In *R. christenseni* and *R. nigromontanus,* however, they are situated so far up in the penial complex and also so distinctly separated, by a pronounced constriction of the lumen, from the lower duct, that it appears logical to consider them to be a part of the epiphallus.

Although the Santa Rita Mountains have been explored extensively for land snails, this population of *R. christenseni* is the only population known to exist. It appears to be a relatively small population of scattered, rare individuals.

The vegetation at the type locality is representative of an ecotone between Lower and Upper Sonaron zones with admixture of riparian species. Dominant trees are *Juniperus monosperma, Prosopis juliflora, Quercus emoryi, Quercus arizonica,* and *Pinus cembroides.* Dominant shrubs are *Mimosa dysocarpa, Acacia greggi, Garrya wrighti, Rhus choriophylla,* and *Rhus trilobata.*

Etymology.—This species is named for Carl C. Christensen, friend and colleague, with whom we have enjoyed numerous pleasant collecting trips. His familiarity with the genus *Rabdotus* enabled him immediately to recognize that this species differed significantly from *R. nigromontanus.*

Acknowledgments

We are indebted to Carl C. Christensen for his critical examination and determination of the specimens and for his critical review of this report. We thank our former graduate students Shelley Maxfield and Robert Carey who accompanied us on the expedition to obtain several live adult specimens. The Anamax Mining Company provided funds to the University of Arizona to perform an Environmental Inventory of the Rosemont Area on Southern Arizona, in the course of which we were able to discover this new species.

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